Abel Mathematics Contest

Grades 4 and 5
May 2016

"It appears to me that if one wishes to make progress in mathematics, one should study the masters and not the pupils."
Niels Henrik Abel
1802-1829

Instructions:

1. Calculators may be used.
2. Select the best answer.
3. Transfer your answers to the Answer Form.
4. Diagrams are not always drawn to scale.
5. The time limit for the Niels Henrik Abel Mathematics Contest is one hour.

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1. 4 x 1000 + 5 x 10 + 2 x 100

A. 4250 **B.** 4520 **C.** 4205 **D.** 4052

2. If yesterday was Saturday, then 15 days after today would be _____

A. Sunday **B.** Friday **C.** Tuesday **D.** Monday

3. Seth listened to music for 20 minutes. What fraction of an hour did he listen to music?

A. $\frac{1}{10}$ **B.** $\frac{1}{5}$ **C.** $\frac{1}{3}$ **D.** $\frac{1}{2}$

4. Which of the following shapes has four equal sides?

A. parallelogram **B.** trapezoid

C. rectangle **D.** rhombus

5. Solve for the value of m:

$$2m = 150$$

A. 75 **B.** 148

C. 152 **D.** 300

6. Yasi has four 25 cent coins and two 10 cent coins. How much more money does she need to have $2.50 ?

A. $2.15 **B.** $3.70 **C.** $1.30 **D.** $1.20

7. $\frac{2}{5}$ of 30 is _____

A. 10 **B.** 12 **C.** 14 **D.** 75

8. Which number below is closest in size to $\frac{2}{3}$?

A. 0.6 **B.** 0.65 **C**. 0.70 **D.** 0.75

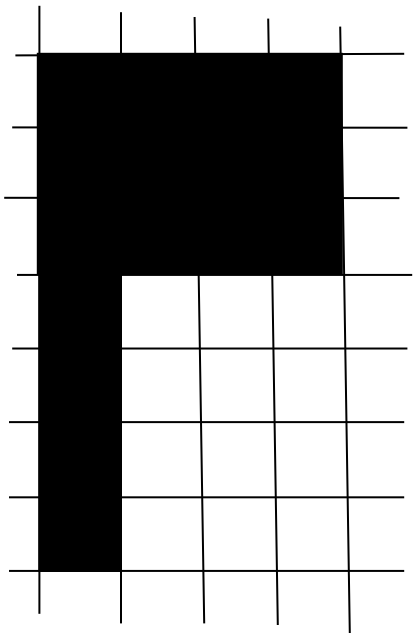
9. Arrange from smallest to biggest: $\frac{3}{5}$, 0.99 , $\frac{7}{10}$, 0.48

A. 0.48 , $\frac{3}{5}$, $\frac{7}{10}$, 0.99

B. $\frac{3}{5}$, $\frac{7}{10}$, 0.48 , 0.99

C. $\frac{7}{10}$, 0.48 , $\frac{3}{5}$, 0.99

D. 0.48 , 0.99 , $\frac{3}{5}$, $\frac{7}{10}$



10. What is the area and perimeter of the shaded region on the right?

A. Area = 12 sq. units Perimeter = 16 units

B. Area = 12 sq. units Perimeter = 20 units

C. Area = 16 sq. units Perimeter = 22 units

D. Area = 16 sq. units Perimeter = 24 units

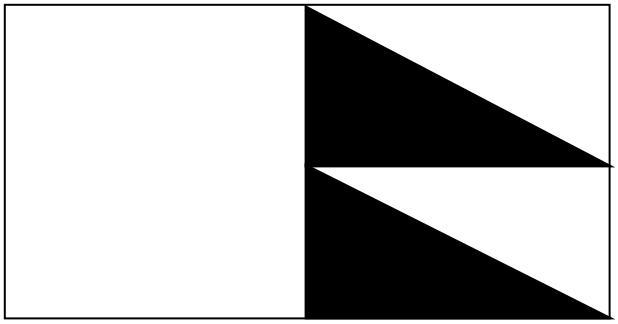
11. Samantha arrived home at 1:45 pm after driving for 2 hours and 53 minutes. What time did she start her drive?

A. 4:38 am **B.** 10:08 am **C.** 10:52 am **D.** 11:08 am

12. Gurjit has an odd number of $2 coins and an even number of $5 bills. Which of the following could NOT be his total amount of money?

A. $27 **B.** $36 **C**. $48 **D.** $56

13. There are two black triangles inside the rectangle below. How many black triangles are still needed to fill the rest of the rectangle?



A. 4 **B.** 6 **C.** 8 **D.** 10

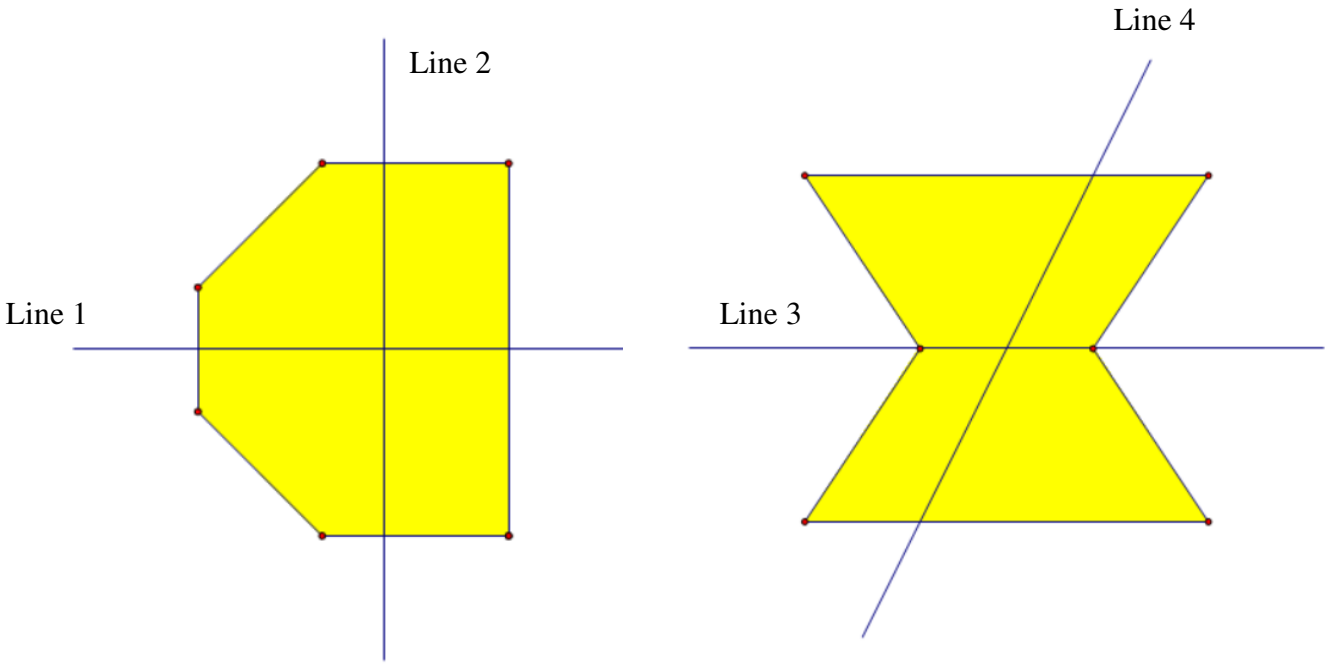
14. For the lines below, which of the following statements is true?

A. Lines 1 and 3 are both lines of symmetry

B. Lines 1, 3 and 4 are all lines of symmetry

C. Lines 2 and 4 are both lines of symmetry

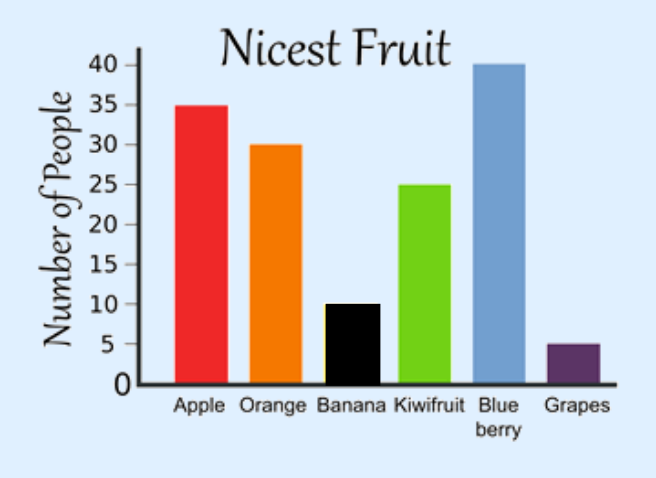
D. Lines 1, 2, 3 and 4 are all lines of symmetry



15. For a survey, the results are graphed on the right. Estimate the **fraction** of people that said oranges are the 'nicest fruit'.

A. $\frac{1}{5}$ **B.** $\frac{1}{3}$

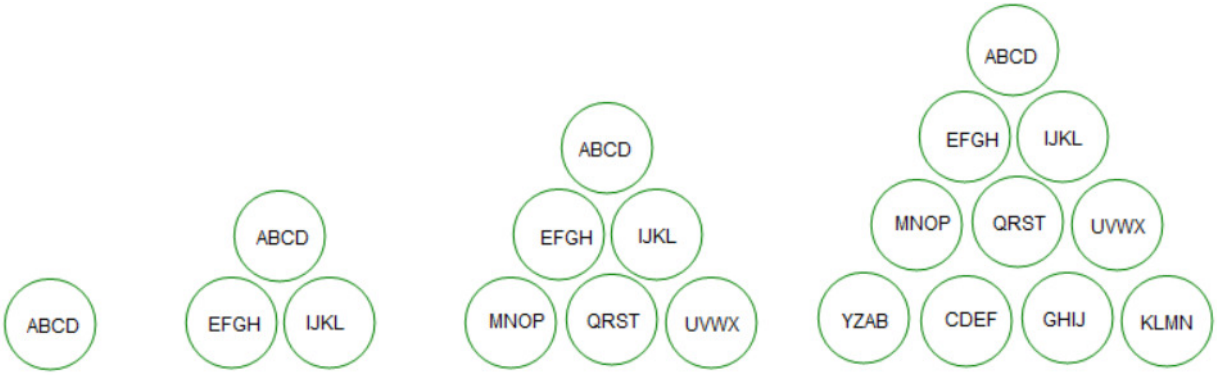
C. $\frac{6}{15}$ **D.** $\frac{3}{8}$



16. How many odd numbers are greater than 20, and less than 85, and a multiple of 7?

A. 11 **B.** 10 **C.** 6 **D.** 5

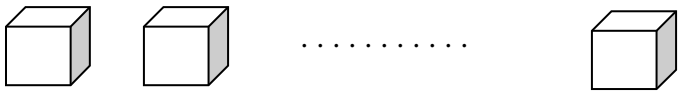
17. If the pattern below continues, what letters will be in the '**bottom left circle**' of the 6th picture? (for example: 'bottom left circle' of 3rd picture has letters MNOP)



1st picture 2nd picture 3rd picture 4th picture

A. EFGH **B.** IJKL **C.** QRST **D.** STUV

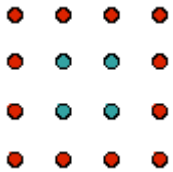
18. A rectangular prism is formed by connecting several cubes like the cubes shown below. The dimensions of the prism (height, width, length) are all greater than 1.



Which number of cubes below could NOT form the rectangular prism?

A. 18 **B.** 20 **C.** 25 **D.** 27

19. The 4 by 4 array on the right has '12 dots on the outside' and '4 dots inside'.



How many dots would be on the **outside** of a 12 by 12 array?

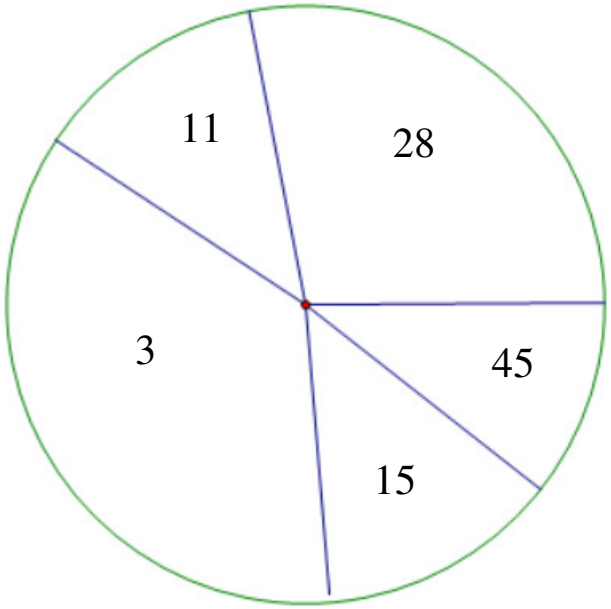
A. 56 **B.** 50 **C.** 48 **D.** 44

20. Ben's heart beats 42 times in 24 seconds. If his heart continues beating at the same rate, approximately how many minutes will it take for his heart to beat 450 times?

A. 2.2 minutes **B.** 2.5 minutes

C. 4.3 minutes **D.** 4.7 minutes

21. The spinner shown is spun once.
Which of the following spins is most likely?



A. a number whose digits have a sum of 2

B. a number less than 10

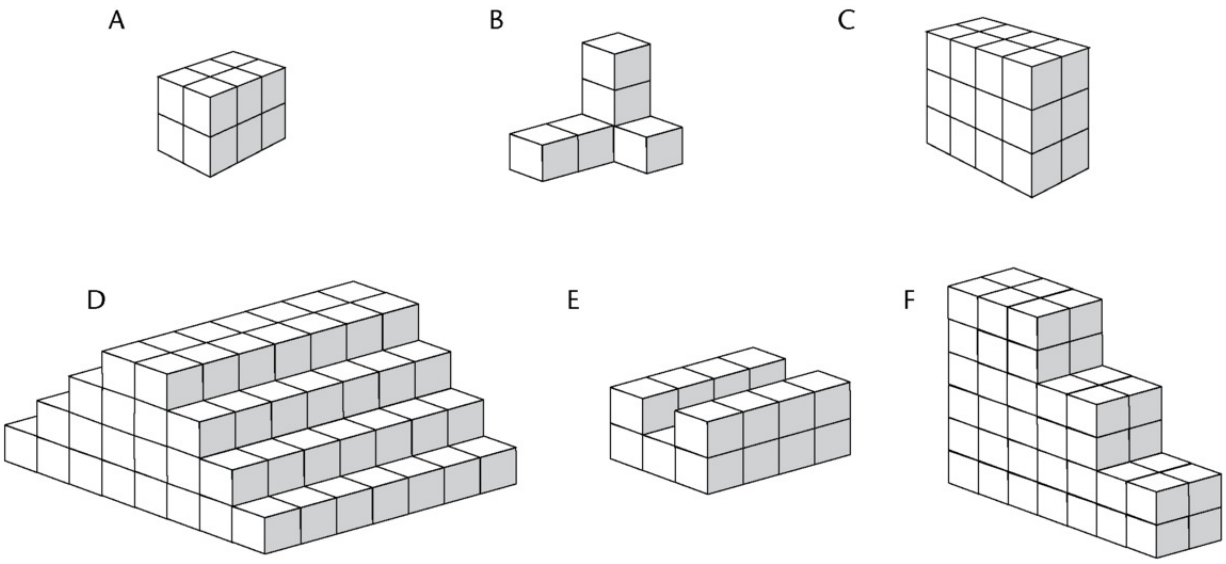
C. an even number

D. a multiple of 5

22. Sort the volumes of the following six objects from least to greatest.

Note:

- there are '***no missing blocks'*** in the parts of the objects you cannot see



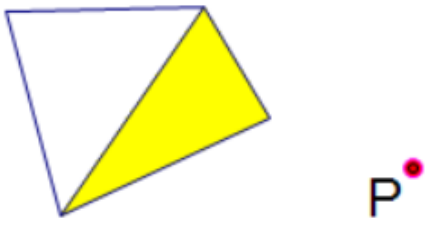
A. A B C E F D

B. A B C E D F

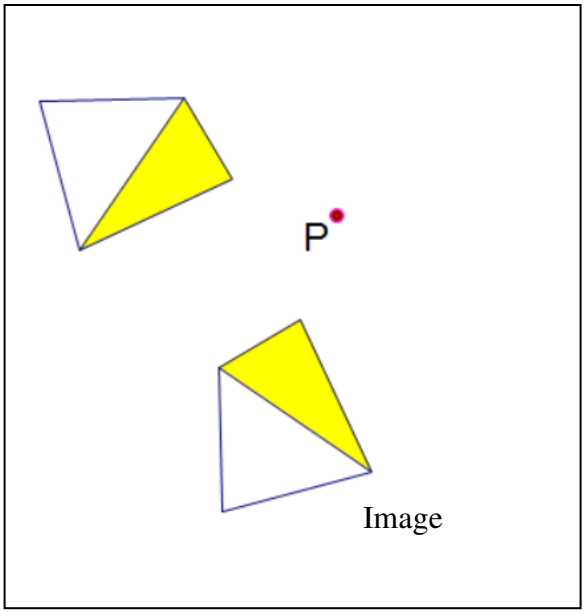
C. B A E C D F

D. B A E C F D

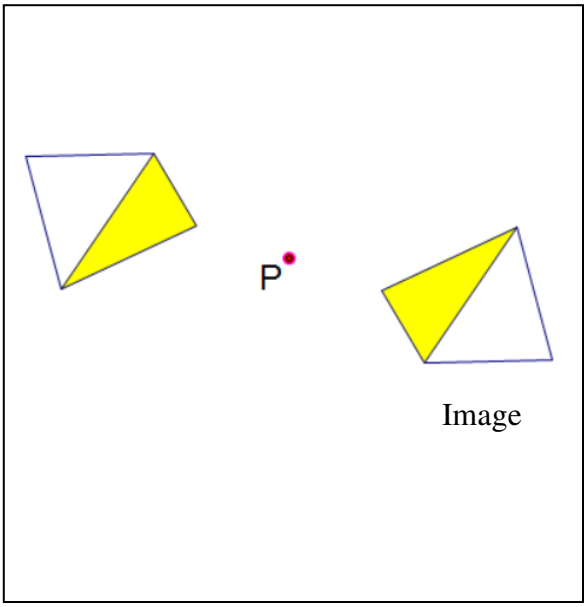
23. The figure below is rotated 180^0 clockwise about point P. What is the resulting image?



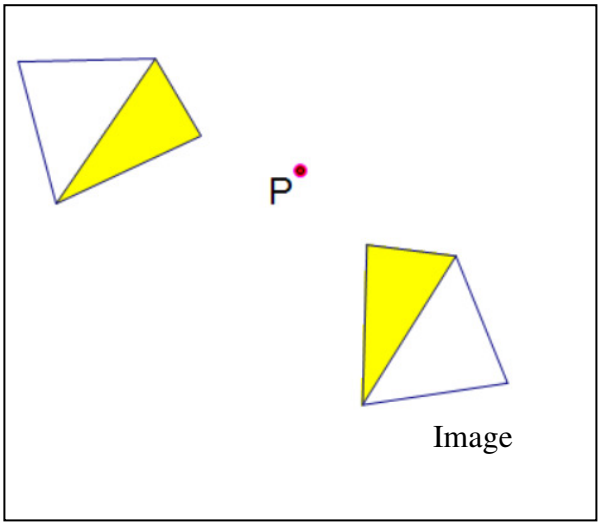
A.



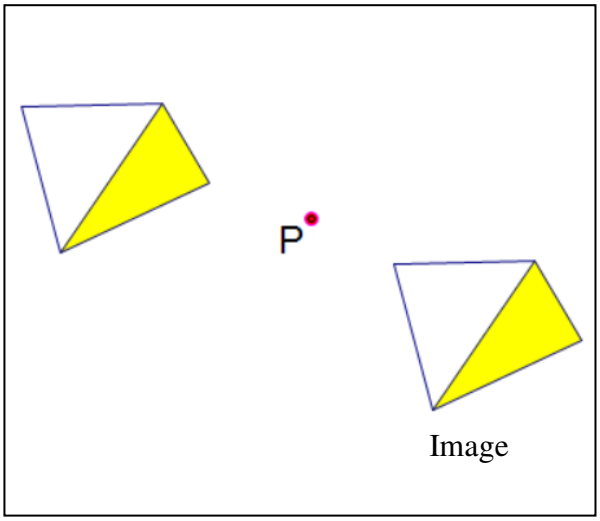
B.



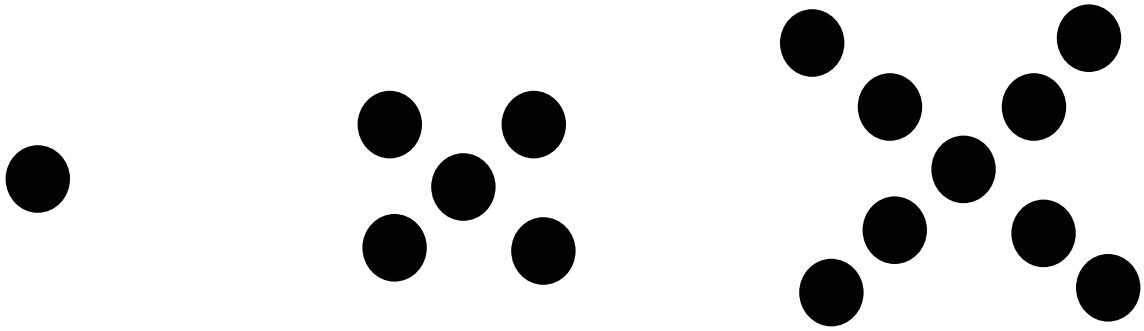
C.



D.



24. If the pattern below continues, how many circles will be in the 8^{th} picture?



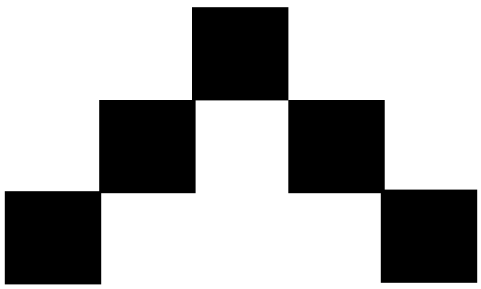
Picture 1

Picture 2

Picture 3

A. 36 **B.** 33 **C.** 29 **D.** 27

25. The total shaded area below is 20 cm^2. What is the perimeter of each square?



A. 4 cm **B.** 5 cm **C.** 6 cm **D.** 8 cm